WITH GLOBAL R&D NETWORKS TO SUCCESS

Franz M. Androsch
voestalpine is a technology and industrial-goods enterprise whose business units boast worldwide leadership in combined material and processing expertise.

With its highest-quality products and systems made of steel and other metals, voestalpine is one of Europe’s leading suppliers to the automotive, household-appliance and oil/gas industries worldwide.
THE voestalpine GROUP

Local to global

2004/05 FY

693.5 million euros

Total business volume outside Europe

2016/17 FY

3,388.4 million euros
THE voestalpine GROUP

500
Group companies and locations

50,000
employees worldwide

11.3 Mrd.
in revenue in 2016/17 FY

1.5 Mrd.
EBITDA in 2016/17 FY

50 Countries

5 Continents
DIVISIONS

**Steel**
- **3,912.4 million** (Sales in euros)
- **33 % share of business volume**

**High Performance Metals**
- **2,697.9 million** (Sales in euros)
- **23 % share of business volume**

**Metal Forming**
- **2,426.1 million** (Sales in euros)
- **21 % share of business volume**

**Metal Engineering**
- **2,684.6 million** (Sales in euros)
- **23 % share of business volume**

(As of 2016/17 FY)
OVERVIEW OF INDUSTRIES

» Products made from steel and other metals for technology-intensive industries and demanding niche segments

» Focus on segments with the highest quality requirements

» Continues extension of the value chain in the direction of the end customer

» Focus on mobility and energy

voestalpine AG

March 2018

F.M. Androsch @ Zukunftskonferenz JR
RESEARCH & DEVELOPMENT

» voestalpine is Austria’s most research-intensive company
» Record-setting budget in BY 2017/18: EUR 159 million
» More than 3,000 patents registered
» Innovations for the biggest growth markets – Mobility and Energy

KEY ISSUES
» Sustainability
» Environmental compatibility
» Energy and Resource efficiency
» Life cycle assessment

CENTRAL FIELDS OF RESEARCH
» High-strength steels and lightweight constructions
» Rail technology for the future
» High-performance materials for aerospace
» High-tech pipe concepts for oil and gas industry
R&D-EXPENDITURE IN MIO. €

05/06  06/07  07/08  08/09  09/10  10/11  11/12  12/13  13/14  14/15  15/16  16/17  17/18

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STRATEGIC INNOVATION GUIDELINES

voestalpine - the next step ahead

Working together for success, from concept to market introduction

We promote the best ideas, creating USPs along the whole value chain

Decentralized R&D departments form a global voestalpine network

Only the best researchers work for voestalpine

Active know-how management, both on the inside and outside, is our key to success
Decentralized R&D departments form a global voestalpine network
R&D SITES ALL OVER THE WORLD

BY 2017/18: 74 companies

China
- voestalpine Böhler Welding China
- voestalpine Profilform China

Singapore
- voestalpine Additive Manufacturing C. Singapore

Taiwan
- voestalpine Technology Institute (Asia)

Indonesia
- PT Böhler Welding Group Asia Pacific

India
- Maruti Weld Private

Poland
- voestalpine SIGNALING Sopot

Hungary
- VAMAV Vasúti Berendezések

Romania
- VAE Apcarom

Australia
- VAE Railway Systems

Great Britain
- voestalpine SIGNALING Fareham
- voestalpine Metsec

Sweden
- Uddehôlms AB
- voestalpine Böhler Welding Nordic
- voestalpine Precision Strip

Germany
- Buderus Edelstahl
- Eifeler Werkzeuge
- voestalpine Additive Manufacturing Center
- voestalpine Rail Center Duisburg
- voestalpine Wire Germany
- voestalpine SIGNALING Saiserholz
- voestalpine SIGNALING Siershahn
- voestalpine BWG
- voestalpine Böhler Welding Germany
- voestalpine Böhler Welding Dortmund
- voestalpine Böhler Welding UTP Mant.
- voestalpine Präzisionsprofil
- voestalpine Ratec
- voestalpine Automotive Components Schwöb. G.
- voestalpine Automotive Components Dettlingen
- voestalpine Automotive Components Nagold
- voestalpine Automotive Components Schömoll

Netherlands
- voestalpine Railpro
- voestalpine Automotive Components Bunschoten Nedcon Groep

Belgium
- voestalpine Böhler Welding Belgium
- voestalpine SADEF

USA
- voestalpine Nortrak
- Roll Forming Corporation

France
- voestalpine Profilatroid

Mexico
- voestalpine Böhler Welding Mexico

Brasil
- Villares Metals
- voestalpine Böhler Welding Soldas do Brazil
- voestalpine Meincol

Spain
- JEZ Sistemas Ferroviarios

Italy
- voestalpine Trafileria Industriale
- voestalpine Böhler Welding Fieleur

South Africa
- VAE SA
R&D-ORGANISATION

R&D AND INNOVATION AS TOP PRIORITY

voestalpine Group Management Board
Strategic R&D-Management
Cross-divisional projects

research committee

Steel
High Performance Metals
Metal Engineering
Metal Forming

R&D responsible persons from companies of each division

Cross-divisional R&D-network: R&D-priorities, highlights, trends, results, information from companies, group projects

research coordination

1 coordinator per division

R&D-management: reporting, budgets, strategy, divisional projects, cooperations, lobbying,...
voestalpine R&D - NETWORK

» 740 employees work for R&D at sites all over the world
  » 70%, i.e. 520 employees are in Austria

» Coordination by various panels
  » Research Board - Strategic R&D-Management
  » Research Coordination - Operative R&D-Management
  » Research Committee - Cross-divisional R&D-network
  » Expert Clusters - Networks of experts on specific topics
  » Group Projects - Cross-divisional R&D-projects
  » Synergy Platform - Yearly event for networking and information exchange on a specific R&D-topic
voestalpine - THE NEXT STEP AHEAD

Working **together** for success, from **concept** to **market** introduction
COOPERATION AS A STRATEGIC INSTRUMENT

» Cooperations are initiated, when a partner is necessary for the success of a project

» The partner is chosen according to demands
  » Topics and deepness of collaboration vary depending on the partner

» Developing and maintaining strategic partnerships
  » All R&D-topics along the value chain are accompanied by scientific partners
  » Collaboration with key customers and suppliers and selected competitors on technologically equal terms

» Target are long-term partnerships
**R&D-COOPERATION WITH SCIENTIFIC PARTNERS**

» The further development of steel requires basic research that is carried out in cooperation with universities, competence centers and research institutes.

» Additionally, scientific partners are an important source for new high-qualified employees.

Around **100 partners worldwide**

» Universities
» Research Institutes
» Competence Centers
» CD-Labs

About **one third** of them is located **in Austria**

Joanneum Research
- Welding of AHSS for automotive components
- Welding of ZnMg-coated sheet
- Welding of metal hybrids
STRATEGIC SCIENTIFIC PARTNERS
USE OF LOCAL EXPERTISE

» Well-known culture
» Geographic proximity
COOPERATION IN voestalpine GROUP PROJECTS

Group projects utilize and link the competencies of at least two divisions

Group Program Additive Manufacturing
» Consists of 31 sub-projects
» Goals are to establish AM in the voestalpine and offer inhouse all-in-one solutions
» Partners
  » 16 voestalpine companies / 4 Divisions / 6 countries
  » Scientific partners: TU Graz, MU Leoben, FH Wels, ACAM Aachen, DMRC Paderborn, ARTC Singapore, University of Cranfield
  » Consulting Partners and several tool manufacturers

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COOPERATION OF INDUSTRY AND SCIENCE
CHRISTIAN DOPPLER LABORATORIES

» Support of basic research on topics from the industry
» Best-practice example of a national funding instrument with clear concept and high degree of target achievement
» Success factors are the high scientific quality, openness regarding topics, long-term, predictable and flexible program
» Currently 6 laboratories with voestalpine participation:

Johannes Kepler Universität Linz
» Multi-scale modelling of multi-phase processes; Simon Schneiderbauer
» Combinatorial Oxide Chemistry; Walter Hassel
» Aging, health and the labor market; Pruckner/Winter-Ebmer

TU Wien
» Anthropogene Resources; Johann Fellner
» Model-based process control in the steel industry; Andreas Kugi
» Early Stages of Precipitation; Ernst Kozeschnik
An international industry-university cooperative research center, sponsored by participating companies

Research Program
- Cold-rolled and coated sheet steels
- Plate and hot-rolled steels
- Bar and forging steels incl. wire

Topics of research are discussed and selected democratically amongst all companies

Results can be used by all companies (use of patents for free)
COOPERATION OF INDUSTRY AND SCIENCE EUROPEAN FUNDING PROGRAMS

» E.g. European Frame Program and RFCS – Research Fund for Coal and Steel
  » Funding programs to promote industrial research and support competitiveness and sustainable development in the EU
  » Collaboration of industrial and scientific partners from all over Europe

» Currently 10 RFCS-projects and 2 projects in Horizon 2020
  » International networking -> know-how exchange on a high-quality level and access to new or alternative methods
R&D-NETWORK OF INDUSTRIAL AND SCIENTIFIC PARTNERS

K1-MET - Competence Center

» Metallurgical and environmental process development

» Collaboration of industrial companies and scientific partners

» Research results are implemented into practice continuously
R&D-NETWORK OF voestalpine-COMPANIES, INDUSTRIAL COMPANIES AND SCIENTIFIC PARTNERS

Project TOPAS - THICKNESS OPTIMIZED PARTS FOR AEROSPACE STRUCTURES

» 3D rollforming decreases buy-to-fly ratio and process time significantly
» Using voestalpine group technology combined with material expertise and aerospace experience of external partners
  » voestalpine SADEF / BE
  » voestalpine Krems / AT
  » voestalpine Precision Strip / AT
  » voestalpine Roll Forming Corp. / US
  » AMAG / AT
  » Ortic AB / SE
  » Uni Siegen Umformtechnik / DE
R&D-COOPERATION WITH CUSTOMERS

» Co-development with customers allow precise response to demands and the development of special solutions

» Introduction of mutual new testing methods and standards accompanying new products

» Cooperation on project basis
  » in the frame of European projects, e.g. ALIVE (7th EU FP)
  » on selected topics

» Long-term partnerships with key customers, esp. from the automotive industry
  » yearly strategy meetings (resident engineers)
FOLLOW THE CUSTOMER - WORLDWIDE OEM PRODUCTION SITES REQUIRE GLOBAL PROVISION OF COMPONENTS

» Large production sites of Mercedes-Benz cars

Production figures: number of cars / year
Source: Mercedes-Benz Cars im Überblick, Ausgabe 2017

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R&D-COOPERATIONS WITH CUSTOMERS

» Development of high-strength, corrosion-resistant steels in friendly collaboration with BMW for complex hot forming processes

» Development of high-strength steels in close collaboration with Toyota for complex structural parts with best formability, narrowest thickness tolerances, high total elongation and high HET values

» The world's longest knuckle-boom crane is made by one of our customers
voestalpine - THE NEXT STEP AHEAD

We promote the best ideas, creating USPs along the whole value chain
PRODUCT INNOVATION PROCESS
STEEL DIVISION

IDEA to CONCEPT
- Idea Generation
  - Employees
  - Customers
  - Trends
  - Technology
  - Competitors
- Idea Screening
  - Idea assessment
  - Idea selection
- Concept Development
  - Pre-Project
  - First market analysis

CONCEPT to INNOVATION
- Development
  - Lab tests
  - Detailed market analysis
- Validation
  - at production plant
  - Business case
- Start-up
  - Serial production reliability
  - Product maturity
- Market Launch
  - Serial production
  - R&D support

G1 G2 G3 G4 G5 G6 G7

ENGINEERING
Conceptual design
Preliminary technical assessment

SALES
Generate ideas
Select ideas
Preliminary market assessment

MARKETING
Define project name
Define brand essence

Product development
Laboratory tests
Tests at production plant
Process development
Market analysis
Develop market entry concept
Define type of brand
Define brand name
Fine tuning of product and process
Gain serial production reliability
Serial production
Finalize market entry concept
Broad market launch
THANK YOU

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